CLAIMS

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1. A sensor device which comprises light source means for emitting a light beam, photodetector means for receiving the light beam after passing through or being reflected within living tissue and arranged to provide signals corresponding to the intensities of the respective wavelength of light received by the photodetector means characterised in that the sensor device measured blood oxygen saturation.

2. A sensor device according to Claim 1 characterised in that the sensor a plurality of wavelengths.

3. A sensor device according to Claim 2 characterised in that the sensor uses a spectral wavelength of from 500 to 600 nm.

4. A sensor device according to Claim 3 characterised in that the sensor uses a spectral wavelength of from 526 to 586 nm.

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5. A sensor device according to Claim 2 characterised in that the different wavelengths bear a predetermined relationship with each other

6. A sensor device according to Claim 2 characterised in that the sensor uses 3 or more different wavelengths.

7. A sensor device according to Claim 6 characterised in that the number of wavelengths used is 5 or 6.

8. A sensor device according to Claim 2 characterised in that at least one of the wavelengths is an isobestic wavelength.

9. A sensor device according to Claim 8 characterised in that most of the wavelengths are isobestic wavelengths.

10. A sensor device according to Claims 7 or 9 characterised in that five wavelengths are isobestic and one wavelength provides the maximum absorption difference between oxygenated haemoglobin and deoxygenated haemoglobin.

11. A sensor device according to Claim 7 characterised in that the number of wavelengths used are selected from 500, 528, 550, 560, 572 and 586 nm.

12. A sensor device according to Claim 7 characterised in that the scattered light is transmitted along 6 separate fibres to 6 photodetectors via narrow-band optical filters all in the range 500 to 600nm.

13. A sensor device according to Claim 12 characterised in that the optical filters are all in the range 526 and 586 nm.

14. A sensor device according to Claim 7 characterised in that the scattered light is transmitted along a single fibre of from 50 to 150nm in diameter used with one to three white LEDs.

15. A sensor device according to Claim 1 characterised in that it operates on reflectance (remittance).

16. A sensor device according to Claim 1 characterised in that is a "hand held" sensor device.

17. A sensor device according to Claim 1 characterised in that it is coupled to an oximeter.

18. A method of SaO_2 monitoring which comprises measuring SO_2 and adding a scaling factor Δ.

19. A method according to Claim 18 characterised in that the method includes the use of a sensor device of claim 1.

20. A method according to Claim 18 characterised in that the sensor is used to continually measure SO_2 and to intermittently measure SaO_2.

21. A method according to Claim 18 characterised in that the Kubelka and Munk transformation is used to account for melanin levels in skin.

22. A method according to claim 21 characterised in that the method involves the use of an algorithm;

$$\text{K-B Transformed spectrum} = 0.5 \times (R^2)/(1-R)$$

where R is the remitted spectrum,

and which involves the steps of measuring the remitted spectrum from a light source measuring arterial blood flow.

23. A method according to claim 18 characterised in that the method the sensor is normalised against darkness and a standard white surface, and the signal from each photodiode is measured to obtain the overall dark and "white balance" figures.

24. A method according to claim 18 characterised in that signal processing includes averaging for a period between 10 milliseconds to 10 seconds, subtracting the white balance signal, and taking a logarithm to produce a transmittance at each wavelength.

25. A method according to claim 18 characterised in that more than 22 absorption values are recorded within that range 526 to 586nm.

26. A method according to claim 18 characterised in that one reference spectrum is of fully oxygenated haemoglobin the other is of fully deoxygenated haemoglobin.

27. A method of monitoring of SIDS in infants which comprises attaching a calibrated sensor according to claim 1 to the skin of a patient and emitting white light, detecting and a measuring the scattered light.

28. A data collection, processing and display system comprising the parameters of code number protection, sampling parameters, supply air flow rates, chamber pressure, exhaust air flow rates, top timer bar, bottom set-up bar and file identification bar.

29. A computer programme product adapted for absorption data collection, processing and display of SO_2 and SaO_2 levels.

30. A computer programme product according to claim 26 characterised in that the processing includes the use of the algorithm:

$$SO_2 = \frac{[HbO_2] \times 100}{[HbO_2] + [Hb]}$$

SaO_2 is arterial oxygen saturation

wherein the reflected absorptions (A) at six wavelengths (500, 528, 550, 560, 572 and 586 nm) are used to calculate two parameters HbI and OXI:

$$HbI = (A_{528} - A_{520}) + (A_{550} - A_{528}) + (A_{572} - A_{550}) - (A_{586} - A_{572})$$

$$OXI = ((A_{550} - A_{50}O) + (A_{572} - A_{560})) / HbI$$

and

SO_2 is calculated from the formula:

$$SO_2 = 100 = (OXI - OXI_o) / (OXI_{100} - OXI_o)$$

wherein OXI_o and OXI_{100} are empirically determined values for OXI at SO_2 values of 0% and 100% in skin.

31. A sensor device programmed with a computer programme according to claim 26.

32. A sensor device substantially as described with reference to the accompanying examples.